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OPNET-based modeling and simulation study on handoffs in Internet-based infrastructure wireless mesh networks.

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Summary: Wireless mesh networks (WMNs) have recently emerged to be a cost-effective solution to support large-scale wireless Internet access. Handoff management plays an important role in WMNs in delivering Quality of Service to mobile users. Hence, the analysis of handoff performance in WMNs is in a critical need for network researchers and engineers. Recently, OPNET simulation platform becomes a leading provider of solutions for evaluating network designs and applications. However, there is no formal approach or methodology as to how OPNET can be used to assess the support and readiness of an Internet-based WMN in supporting handoffs incurred by various roaming types. In this paper, we propose detailed simulation models for network topology and elements necessary to construct an Internet-based infrastructure WMN using OPNET, along with the modeling and implementation of two handoff designs considering the special design challenges in WMNs. Sequential handoff steps involved in multilayer handoffs are analyzed thoroughly via the OPNET debug tool. Moreover, the paper discusses many design and engineering issues pertaining to the deployment of handoff management in Internet-based infrastructure WMNs. The implemented simulation module provides handoff performance results for both intra- and inter-gateway roaming scenarios and can be an effective evaluation tool for handoff management designs in Internet-based infrastructure WMNs.

Keywords: wireless mesh networks; handoff; inter-gateway roaming; OPNET simulation
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